

**CURRICULUM VITAE**

**David H. Gelfand**

**Personal Statistics**

Date of Birth: June 9, 1944  
Place of Birth: New York, New York

**Education**

1970 Ph.D. Biology, University of California, San Diego, La Jolla, California  
1966 A.B. Biology, Brandeis University, Waltham, Massachusetts

**Research and Professional Experience**

12/91 - Present Director, Program in Core Research  
Roche Molecular Systems  
1145 Atlantic Avenue  
Alameda, CA 94501-1145

11/88 - 12/91 Director, Core Technology, PCR Division, Cetus Corporation

3/81 - 12/91 Vice President, Scientific Affairs, Cetus Corporation

1/79 - 3/81 Vice President and Director of Recombinant Molecular Research, Senior Scientist,  
Cetus Corporation

12/76 - 10/79 Director, Recombinant Molecular Research  
Cetus Corporation

8/76 - 1/77 Assistant Research Biochemist, University of California at  
San Francisco, San Francisco, CA

Sponsor: William J. Rutter, Professor

Project: Isolation, characterization and expression of eucaryotic DNA sequences in bacterial cells.

1/72 - 8/76 Assistant Research Biochemist and Laboratory Manager, University of California at San  
Francisco, San Francisco, California

Sponsor: Gordon M. Tomkins, Professor (deceased July 1975)

Project: Effect of oncogenic viral transformation on the regulation of gene expression in cultured  
mammalian cells.

Isolation and characterization of mutants defective in tyrosine aminotransferase activity.

Construction of hybrid DNA molecules and genetic transformation.

7/70 - 1/72	Research Associate in Biology, University of California at San Diego, La Jolla, California
Sponsor:	Masaki Hayashi, Associate Professor
Project:	DNA-dependent RNA-directed protein synthesis <i>in vitro</i> : temporal control of transcription and translation.
5/70 - 7/70	NIH postdoctoral trainee in Molecular Genetics, University of California at San Diego, La Jolla, California
Sponsor:	Masaki Hayashi, Associate Professor
Project:	Same as above.
10/66 - 5/70	NIH predoctoral trainee in Molecular Genetics, University of California at San Diego, La Jolla, California
Sponsor:	Masaki Hayashi, Associate Professor
Project:	Viral DNA-dependent protein synthesis
7/66 - 10/66	Research Associate in Biology, University of California at San Diego, La Jolla, California
Sponsor:	Stanley Mills, Professor
Project:	Passive immune kill in HeLA cells <i>in vitro</i> .
6/65 - 9/65	Research Assistant in Biochemistry, Brandeis University, Waltham, Massachusetts
Sponsor:	Gordon Sato, Associate Professor
Project:	Mechanism of steroid production and secretion in mouse tumor cells <i>in vitro</i> .
6/62 - 9/62	Research Assistant, School of Medicine, University of Michigan, Ann Arbor, Michigan
Sponsor:	Raymond H. Kahn, Professor
Project:	Effect of <i>Tubercule bacilli</i> in chick embryonic lung tissue <i>in vitro</i> .
6/61 - 9/61	Research Assistant, Department of Biology, New York University, New York, New York
Sponsor:	M. J. Kopac, Professor
Project:	Establishment of primary cell lines of amphibian liver <i>in vitro</i> .

### Awards and Honors

New York State S.E. Regional Science Fair, First Prize winner, Senior Division Biology and Grand Prize Winner (1962).

New York State Science Fair Finalist Sixth Prize (1962).

Awarded New York State four-year full-tuition scholarship (award not accepted).

Recipient, May 1990, IPO "Distinguished Inventor Award," Senate Office Building.

### Memberships

American Association for the Advancement of Science

American Society of Biochemistry and Molecular Biology

American Society of Microbiology

National Science Foundation Scientific Advisory Council (1981-1984)

Department Visiting Committee, Department of Microbiology, University of Texas, Austin (1988- )

### Publications

1. Gelfand, D.H., and Hayashi, M. (1969). Electrophoretic characterization of  $\Phi$ X174-specific proteins. *J. Mol. Biol.*, 44:501-516.
2. Gelfand, D.H., and Hayashi, M. (1969). DNA-dependent RNA-directed protein synthesis *in vitro*, II: Synthesis of a  $\Phi$ X174 coat protein component. *Proc. Natl. Acad. Sci. USA*, 63:135-137.
3. Bryan, R.N., Gelfand, D.H., and Hayashi, M. (1969). Initiation of SV40 DNA-directed protein synthesis with N-formylmethionine *in vitro*. *Nature*, 224:1019-1021.
4. Gelfand, D.H., and Hayashi, M. (1970). DNA-dependent RNA-directed protein synthesis *in vitro*, IV: Peptide analysis of an *in vitro* and *in vivo*  $\Phi$ X174 structural protein. *Proc. Natl. Acad. Sci. USA*, 67:13-17.
5. Jeng, Y., Gelfand, D.H., Hayashi, M., Schleser, R., and Tessman, E.S. (1970). The eight genes of bacteriophages  $\Phi$ X174 and S13 and comparison of the phage-specific proteins. *J. Mol. Biol.*, 49:521-526.
6. Gelfand, D.H. (1970). Viral DNA-Dependent Protein Synthesis. Ph.D. dissertation.
7. Gelfand, D.H., and Hayashi, M. (1970). *In vitro* synthesis of a DNA-dependent RNA polymerase coded on Coliphage T7 genome. *Nature*, 228:1162-1165.

8. Rousseau, G.G., Higgins, S.J., Baxter, J.D., Gelfand, D.H., and Tomkins, G.M. (1975). Binding of glucocorticoid receptors to DNA. *J. Biol. Chem.*, 250:6015-6021.
9. Polisky, B., Bishop, R.J., and Gelfand, D.H. (1976). A plasmid cloning vehicle allowing regulated expression of eukaryotic DNA in bacteria. *Proc. Natl. Acad. Sci. USA*, 73:3900-3904.
10. Ivarie, R.D., Gelfand, D.H., Jones, P.P., O'Farrell, P.Z., Polisky, B.H., Steinberg, R.A., and O'Farrell, P.H. (1977). Biological Applications of Two-Dimensional Gel Electrophoresis. In: *Electrofocusing and Isotachopheresis* (B.J. Radola and D. Graesslin, eds.), Walter deGruyter, Berlin, N.Y., pp. 369-384.
11. Gelfand, D.H., and Steinberg, R.A. (1977). Mutants of *Escheria coli* deficient in the aspartate and aromatic amino acid aminotransferases. *J. Bact.*, 130:429-440.
12. Gelfand, D.H., and Rudo, N. (1977). Mapping of the aspartate and aromatic amino acid aminotransferase genes *tryB* and *aspC*. *J. Bact.*, 130:441-444.
13. Bell, G.I., Degennaro, L.J., Gelfand, D.H., Bishop, R.J., Valenzuela, P., and Rutter, W.J. (1977). Ribosomal RNA genes of *Saccharomyces cerevisiae*, I: Physical map of the repeating unit and location of the regions coding for 5S, 5.8S, 18S and 25S ribosomal RNAs. *J. Biol. Chem.*, 252:8118-8125.
14. O'Farrell, P.H., Polisky, B. and Gelfand, D.H. (1978). Regulated expression by read-through translation from a plasmid encoded  $\beta$ -galactosidase. *J. Bact.*, 134:645-654.
15. Gelfand, D.H., Shepard, H.M., O'Farrell, P.H., and Polisky, B. (1978). Isolation and characterization of a ColE1-derived plasmid copy-number mutant. *Proc. Natl. Acad. Sci. USA*, 75:5869-5873.
16. Shepard, H.M., Gelfand, D.H., and Polisky, B. (1979). Analysis of a recessive plasmid copy number mutant: Evidence for negative control of ColE1 replication. *Cell*, 18:267-275.
17. Polisky, B., Gelfand, D.H., and Shepard, H.M. (1980). ColE1 plasmid replication control. In: *Plasmids and Transposons*, (C. Stutter and K.R. Rozee, eds.), Academic Press, New York, N.Y., pp. 313-323.
18. Cape, R.E., Gelfand, D.H., Innis, M.A., and Neidleman, S.L. (1982). An introduction to the present state and future role of genetic manipulation in the development of overproducing microorganisms. In: *Overproduction of Microbial Products*, (V. Krumphanzl, B. Sikyta and Z. Vanek, eds.), Academic Press, New York, N.Y., pp. 327-343.
19. Shoemaker, S., Schweickart, V., Ladner, M., Gelfand, D.H., Kwok, S., Myambo, K., and Innis, M. (1983). Molecular cloning of Exo-Cellobiohydrolase I derived from *Trichoderma reesei* strain L27. *Bio/Technology*, 1:691-696.
20. Innis, M.A., Holland, M.J., McCabe, P.C., Cole, G.E., Wittman, V.P., Tal, R., Watt, K.W.K., Gelfand, D.H., Holland, J.P., and Meade, J.H. (1985). Expression, glycosylation, and secretion of an aspergillus glucoamylase by *Saccharomyces cerevisiae*. *Science*, 228:21-26.
21. Greenfield, L., Dovey, H.F., Lawyer, F.C., and Gelfand, D.H. (1986). High-level expression of Diphtheria Toxin Peptides in *Escherichia coli*. *Bio/Technology*, 4:1006-1011.

22. Meade, J.M., White, T.J., Shoemaker, S.P., Gelfand, D.H., Chang, S., and Innis, M.A. (1987). Molecular cloning of Carbohydrases for the food industry. In: *Impact of Biotechnology on Food Production and Processing*. (D. Knorr, ed.) Marcel Dekker, New York, N.Y., pp. 393-411.
23. Van Arsdell, J.N., Kwok, S., Schweikart, V.L., Ladner, M.B., Gelfand, D.H., and Innis, M.A. (1987). Cloning, characterization, and expression in *Sacchaomyces cerevisiae* of Endoglucanase I from *Trichoderma reesei*. *BioTechnology*, 5:60-64.
24. Innis, M.A., McCabe, P.C., Cole, G.E., Wittman, V.P., Tal, R., Gelfand, D.H., Holland, M.J., Ben-Bassat, A., McRae, J., Inlow, D., and Meade, J.H. (1987). *Expression of Glucomylase in Yeast for Fermentation of Liquified Starch*. In: *Biochemistry & Molecular Biology of Industrial Yeasts*. (G. Stewart, I. Russell, R. Klein, and R. Hiebseh, eds.), C.R.C. Press, Boca Raton, Florida.
25. Erlich, H.A., Gelfand, D.H., and Saiki, R.K. (1988). Specific DNA Amplification. *Nature*, 331:461-462.
26. Saiki, R.K., Gelfand, D.H., Stoffel, S., Scharf, S.J., Higuchi, R., Horn, G.T., Mullis, K.B., and Erlich, H.A. (1988). Primer-Directed Enzymatic Amplification of DNA with a Thermostable DNA Polymerase. *Science*, 239:487-491.
27. Innis, M.A., Myambo, K.B., Gelfand, D.H., and Brow, M.A.D. (1988). DNA Sequencing with *Thermus aquaticus* DNA Polymerase, and Direct Sequencing of PCR-amplified DNA. *Proc. Natl. Acad. Sci. USA*, 85:9436-9440.
28. Scharf, S.J. and Gelfand, D.H. (1988). *Taq* DNA Polymerase. In: *Current Protocols in Molecular Biology*. (F. Ausubel, et. al., eds.), Greene Publishing and J. Wiley & Sons, New York, N.Y.
29. Lawyer, F.C., Stoffel, S., Saiki, R.K., Myambo, K., Drummond, R., and Gelfand, D.H. (1989). Isolation, Characterization, and Expression in *Escherichia coli* of the DNA Polymerase Gene from *Thermus aquaticus*. *J. Biol. Chem.*, 264:6427-6437.
30. Gelfand, D.H. (1989). *Taq* DNA Polymerase. In: *PCR Technology: Principles and Applications for DNA Amplification*. (Erlich, H.A., ed.), Stockton Press, New York, N.Y., pp. 17-22.
31. Innis, M.A., Gelfand, D.H., Sninsky, J.J., and White, T.J., eds. (1990). *PCR Protocols: A Guide to Methods and Applications*, Academic Press, San Diego, CA.
32. Innis, M.A. and Gelfand, D.H. (1990). Optimization of PCRs. In: *PCR Protocols: A Guide to Methods and Applications*. *ibid.* pp. 3-12.
33. Gelfand, D.H. and White, T.J. (1990). Thermostable DNA Polymerases. In: *PCR Protocols: A Guide to Methods and Applications*. *ibid.* pp. 129-141.
34. Wong, H.C., Fear, A.L., Calhoon, R.D., Eichinger, G.H., Mayer, R., Amikam, D., Benziman, M., Gelfand, D.H., Meade, J.H., Emerick, A.W., Bruner, R., Ben-Bassat, A., and Tal, R. (1990). Genetic Organization of the Cellulose Synthase Operon in *Acetobacter xylinum*. *Proc. Natl. Acad. Sci. USA*, 87:8130-8134.
35. Erlich, H.A., Gelfand, D.H., and Sninsky, J.J. (1991). Recent Advances in the Polymerase Chain Reaction. *Science* 252:1643-1651.

36. Myers, T.W. and Gelfand, D.H. (1991). Reverse Transcription and DNA Amplification by a *Thermus Thermophilus* DNA Polymerase. *Biochemistry* 30:7661-7666.
37. Holland, P.M., Abramson, R.D., Watson, R., and Gelfand, D.H. (1991). Detection of Specific Polymerase Chain Reaction Product by Utilizing the 5'→3' Exonuclease Activity of *Thermus aquaticus* DNA Polymerase. *Proc. Natl. Acad. Sci. USA* 88:7276-7280.
38. Abramson, R.D., Stoffel, S., and Gelfand, D.H. (1991). Extension Rate and Processivity of *Thermus aquaticus* DNA Polymerase. Submitted.
39. Barany, F. and Gelfand, D.H. (1991). Cloning, Overexpression and Nucleotide Sequence of a Thermostable DNA Ligase-Encoding Gene. *Gene* 109:1-11.

#### Issued U.S. Patents

1. Gelfand, D.H. "Stable High Copy Number Plasmids." U.S. Patent No. 4,631,257 assigned to Cetus Corp. 12/23/86.
2. Gelfand, D.H., Chang, S., and Wong, H.C. "Polypeptide Expression Using a Portable Temperature Sensitive Control Cassette with a Positive Retroregulatory Element." U.S. Patent No. 4,666,848 assigned to Cetus Corp. 5/19/87.
3. Gelfand, D.H. and Lawyer, F.C. "A Portable Temperature-Sensitive Control Cassette." U.S. Patent No. 4,711,845 assigned to Cetus Corp. 12/8/87.
4. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Universal Dominant Selectable Marker Cassette." U.S. Patent No. 4,784,949 assigned to Cetus Corp. 11/15/88.
5. Gelfand, D.H., Greenfield, L.I., and Lawyer, F.C. "Recombinant Diphtheria Toxin Fragments." U.S. Patent No. 4,830,962 assigned to Cetus Corp. 5/16/89.
6. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "SV40 Early and RSV Promoters Useful in *Saccharomyces* Expression." U.S. Patent No. 4,870,013 assigned to Cetus Corp. 9/26/89.
7. Gelfand, D.H. and Stoffel, S. "Purified Thermostable Enzyme." U.S. Patent No. 4,889,818 assigned to Cetus Corp. 12/26/89.
8. Mullis, K.B., Erlich, H.A., Gelfand, D.H., Horn, G., and Saiki, R.K. "Process for Amplifying Detecting, and/or Cloning Nucleic Acid Sequences Using a Thermostable Enzyme." U.S. Patent No. 4,965,188 assigned to Cetus Corp. 10/23/90.
9. Gelfand, D.H. "Stable High Copy Number Plasmids." U.S. Patent No. 4,966,840 assigned to Cetus Corp. 10/30/90.
10. Innis, M.A., Gelfand, D.H., and Meade, J.H. "DNA Expression Vector and Use Thereof." U.S. Patent No. 5,045,463 assigned to Cetus Corp. 9/3/91.

11. Innis, M.A., Myambo, K.B., Gelfand, D.H., and Brown, M.A.D. "Methods for DNA Sequencing with *Thermus aquaticus* DNA Polymerase." U.S. Patent No. 5,075,216 assigned to Cetus Corp. 12/24/91.
12. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Purified Thermostable Enzyme." U.S. Patent No. 5,079,352 assigned to Cetus Corp. 1/7/92.
13. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Selectable Fusion Protein Having Aminoglycoside Phosphotransferase Activity." U.S. Patent No. 5,116,750 assigned to Cetus Corp. 5/26/92.

*Curriculum Vitae***Randall Kelchi Salki**

**Address:** 320 39th St.  
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**Phone:** (510) 814-2917 (work)  
(415) 236-0615 (home)

**Birthdate:** April 9, 1955

**Current Position:** Research Investigator  
Department of Human Genetics  
Roche Molecular Systems  
1145 Atlantic Avenue  
Alameda, CA 94501

**Education:**

Sep 1975 - Jun 1978	University of Washington Seattle, WA	B.A. Chemistry B.S. Biology
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Sep 1973 - Jun 1975	Occidental College Los Angeles, CA
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**Research Experience:**

Dec 1991 - present	Research Investigator, Department of Human Genetics, Roche Molecular Systems, Alameda, CA
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Jul 1989 - Dec 1991	Scientist, Department of Human Genetics, Cetus Corporation, Emeryville, CA
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Jul 1986 - Jun 1989	Associate Scientist, Dept of Human Genetics, Cetus Corporation
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Jul 1981 - Jun 1986	Research Associate, Dept of Human Genetics, Cetus Corporation
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Jan 1981 - Jun 1981	Research Associate, Recombinant DNA Group, Cetus Corporation
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Oct 1979 - Dec 1980	Research Assistant, Recombinant DNA Group, Cetus Corporation
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Sep 1979	Laboratory Technician, Department of Biology, Washington University, St. Louis, MO
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Jul 1978 - Aug 1979	Laboratory Technician, Department of Microbiology, University of Washington, Seattle, WA
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Dec 1975 - Jun 1978	Undergraduate Research / Laboratory Technician, Department of Biochemistry, University of Washington
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**Memberships:** American Society of Human Genetics



**Research Publications:**

1. Schilde-Rentschler L, Gordon MP, Saiki R, Melchers G. Mutants of *Agrobacterium tumefaciens* with temperature sensitivity in respect to their tumor inducing ability. *Mol Gen Genet* 1977; 155:235-239.
2. Chilton MD, Saiki RK, Yadav N, Gordon MP, Quetier F. T-DNA from *Agrobacterium* Ti plasmid is in the nuclear DNA fraction of crown gall tumor cells. *Proc Natl Acad Sci USA* 1980; 77:4060-4064.
3. Yadav NS, Postle K, Saiki RK, Thomashow MF, Chilton M-D. T-DNA of a crown gall teratoma is covalently joined to host plant DNA. *Nature* 1980; 287:458-461.
4. Stetler D, Das H, Nunberg JH, Saiki R, Sheng-Dong R, Mullis KB, Weissman SM, Erlich HA. Isolation of a cDNA clone for the human HLA-DR $\alpha$  chain by using a synthetic oligonucleotide as a hybridization probe. *Proc Natl Acad Sci USA* 1982; 79:5966-.
5. Erlich HA, Stetler D, Saiki R, Gladstone P, Pious D. Mapping of the genes encoding the HLA-DR $\alpha$  chain and the HLA-related antigens to a chromosome 6 deletion by using genomic blotting. *Proc Natl Acad Sci USA* 1983; 80:2300-.
6. Erlich H, Stetler D, Sheng-Dong R, Saiki R. Analysis by molecular cloning of the human class II genes. *Fed Proc* 1984; 43:3025-3030.
7. Bell JI, Estess P, St John T, Saiki R, Watling DL, Erlich HA, McDevitt HO. DNA sequence and characterization of human class II major histocompatibility complex  $\beta$  chains from the DR1 haplotype. *Proc Natl Acad Sci USA* 1985; 82:3405-3409.
8. Saiki RK, Arnheim N, Erlich HA. A novel method for the detection of polymorphic restriction sites by cleavage of oligonucleotide probes: Application to sickle cell anemia. *Bio/Tech* 1985; 3:1008-1012.
9. Saiki RK, Scharf SJ, Faloona FA, Mullis KB, Horn GT, Erlich HA, Arnheim, N. Enzymatic amplification of  $\beta$ -globin genomic sequences and restriction site analysis for diagnosis of sickle cell anemia. *Science* 1985; 230:1350-1354.
10. Saiki RK, Bugawan TL, Horn GT, Mullis KB, Erlich HA. Analysis of enzymatically amplified  $\beta$ -globin and HLA-DQ $\alpha$  DNA with allele-specific oligonucleotide probes. *Nature* 1986; 324:163-166.
11. Mullis KB, Faloona FA, Scharf SJ, Saiki RK, Horn GT, Erlich, HA. Specific enzymatic amplification of DNA *in vitro*: The polymerase chain reaction. *Cold Spring Harbor Symp Quant Biol* 1986; 51:263-273.
12. Embury SH, Scharf SJ, Saiki RK, Gholson MA, Golbus M, Arnheim N, Erlich HA. Rapid prenatal diagnosis of sickle cell anemia by a new method of DNA analysis. *N Engl J Med* 1987; 316:656-661.
13. Impraim CC, Saiki RK, Erlich HA, Telplitz RL. Analysis of DNA extracted from formalin-fixed paraffin-embedded tissues by enzymatic amplification and hybridization with sequence-specific oligonucleotides. *Biochem Biophys Res Comm* 1987; 142:710-716.

14. Wong C, Dowling CE, Saiki RK, Higuchi RG, Erlich HA, Kazazian HH Jr. Direct genomic sequencing of amplified DNA: Rapid characterization of unknown  $\beta$ -thalassemia mutations. *Nature* 1987; 330:384-386.
15. Saiki RK, Gelfand DH, Stoffel S, Scharf S, Higuchi RH, Horn GT, Mullis KB, Erlich HA. Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. *Science* 1988; 239:487-491.
16. Farr CJ, Saiki RK, Erlich HA, McCormick F, Marshall CJ. Analysis of *ras* gene mutations in acute myeloid leukemia using the polymerase chain reaction and oligonucleotide probes. *Proc Natl Acad Sci USA* 1988; 85:1629-1633.
17. Erlich HA, Gelfand D, Saiki RK. Specific DNA amplification. *Nature* 1988; 331:461.
18. Bugawan TL, Saiki RK, Levenson CH, Watson RM, Erlich HA. The use of non-radioactive oligonucleotide probes to analyze enzymatically amplified DNA for prenatal diagnosis and forensic HLA typing. *Bio/Tech* 1988; 6:943-947.
19. Saiki RK, Chang C-A, Levenson CH, Warren TC, Boehm CD, Kazazian HH Jr, Erlich HA. Diagnosis of sickle cell anemia and  $\beta$ -thalassemia with enzymatically amplified DNA and non-radioactive allele-specific oligonucleotide probes. *N Engl J Med* 1988; 319:537-541.
20. Higuchi RG, Krummel B, Saiki RK. A general method of *in vitro* preparation and specific mutagenesis of DNA fragments: Study of protein and DNA interactions. *Nucleic Acids Res* 1988; 16:7351-7367.
21. Li H, Gyllenstein UB, Cui X, Saiki RK, Erlich HA, Arnheim N. Amplification and analysis of DNA sequences in single human sperm and diploid cells. *Nature* 1988; 335:414-417.
22. Cal S-P, Chang C-A, Zhang JZ, Saiki RK, Erlich HE, Kan YW. Rapid prenatal diagnosis of  $\beta$ -thalassemia using DNA amplification and nonradioactive probes. *Blood* 1989; 73:372-374.
23. Ristaldi MS, Pirastu M, Rosatelli C, Monni G, Erlich HA, Saiki RK, Cao A. Strategy for prenatal diagnosis of  $\beta$ -thalassemia in Mediterranean populations by dot blot analysis with allelic specific oligo probes. *Prenat Diagn* 1989; 9:629-638.
24. Lawyer FC, Stoffel S, Saiki RK, Myambo KB, Drummond R, Gelfand DH. Isolation, characterization, and expression in *Escheria coli* of the DNA polymerase gene from *Thermus aquaticus*. *J Biol Chem* 1989; 264:6427-6437.
25. Saiki RK, Walsh PS, Levenson CH, Erlich HA. Genetic analysis of amplified DNA with immobilized sequence-specific oligonucleotide probes. *Proc Natl Acad Sci USA* 1989; 86:6230-6234.
26. Lebo RV, Saiki RK, Swanson K, Montano MA, Erlich HA, Golbus MS. Prenatal diagnosis of  $\alpha$ -thalassemia by polymerase chain reaction and dual restriction enzyme analysis. *Hum Genet* 1990; 85:293-299.

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### **Book Chapters:**

1. Saiki RK. Sickle cell disease. In: McGraw-Hill Yearbook of Science and Technology. New York:McGraw-Hill, 1987:411-414.
2. Saiki RK, Gyllenstein UB, Erlich HA. The polymerase chain reaction. In: Davies KE, ed. Genome Analysis: A Practical Approach. Oxford:IRL Press, 1988:141-152.
3. Saiki RK. The design and optimization of PCR. In: Erlich HA, ed. PCR Technology. New York:Stockton Press, 1989:7-16.
4. Saiki RK. Amplification of genomic DNA. In: Innis MA, Gelfand DH, Sninsky JJ, White TJ, eds. PCR Protocols. San Diego:Academic Press, 1990:13-20.

### **Issued Patents:**

1. US Patent 4,683,194 issued July 28, 1987. Saiki RK, Erlich HA. Method for detection of polymorphic restriction sites and nucleic acid sequences.
2. US Patent 4,683,195 issued July 28, 1987. Mullis KB, Erlich HA, Arnheim N, Horn GH, Saiki RK, Scharf SJ. Process for amplifying, detecting, and/or cloning nucleic acid sequences.
3. US Patent 4,800,159 issued January 24, 1989. Mullis KB, Erlich HA, Arnheim N, Horn GH, Saiki RK, Scharf SJ. Process for amplifying, detecting, and/or cloning nucleic acid sequences.
4. US Patent 4,965,188 issued October 23, 1990. Mullis KB, Erlich HA, Gelfand DH, Horn GT, Saiki RK. Process for amplifying, detecting, and/or cloning nucleic acid sequences using a thermostable enzyme.

## Curriculum Vitae

Susanne Stoffel  
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**BIRTHDATE** July 8, 1950, Zurich, Switzerland

### EDUCATION

1966-1969 Chemistry Department of the Forensics Institute; University of Zurich.  
Apprenticeship as Laboratory Technician in Chemistry/Vocational School; Zurich.

1957 - 1966 Secondary & Primary school; Zurich

### PROFESSIONAL EXPERIENCE

7/90 - present Research Associate II  
Supervisor: Dr. David Gelfand

7/84 - 6/90 Research Assistant III, Cetus Corporation, Emeryville, CA 94608

5/81 - 7/84 Research Assistant; Cetus Corporation, Emeryville, CA 94608

5/79 - 5/81 Laboratory Associate II; Cetus Corporation, Emeryville, CA 94608

10/78 - 5/79 Laboratory Associate I; Cetus Corporation, Emeryville, CA 94608  
Dr. David Gelfand

5/75 - 11/77 Virology Institute; University of Zurich.  
Professor Robert Wyler

9/73 - 7/74 Brandeis University, Waltham, MA 02154.  
Professor Harlyn O. Halvorson

4/69 - 7/73 Microbiology Department; Federal Institute of Technology (ETH); Zurich.  
Professor Armin Fiechter

### TECHNICAL CAPABILITIES

**Languages** Fluent in English, German  
Reading, some speaking in French and Spanish.

**Molecular Biology** Cloning in plasmids and expression of cloned gene products in *E. coli* and yeast.  
Standard techniques include oligonucleotide-directed mutagenesis, agarose and

acrylamide gel electrophoresis, Southern and Northern analysis of DNA and RNA, Western analysis of proteins, nick-translation and end-labeling of DNA, isolation and purification of DNA from microorganisms.

Biochemistry	Purification and characterization of native and recombinant DNA-derived enzymes. During last five years special emphasis on identification, purification and characterization of the properties of thermophilic DNA polymerases. Standard techniques include liquid chromatography, ELISA, enzyme activity assays, two dimensional gel analysis, and protein assays.
Virology	Tissue culture of primary cells and cell lines. Cultivation of virus on eggs.
Microbiology	Batch- and continuous-culture fermentation of <i>E. coli</i> and yeast. Standard microbiology techniques include handling of pathogenic strains.
Chemistry	Detection and quantification of drugs and poisons in human tissue, blood, and urine. Standard methods include IR- and atomic absorption spectroscopy.

#### AWARDS AND HONORS

Recipient, May 1990, IPO, Distinguished Inventor Award, Senate Office Building

#### BIBLIOGRAPHY

##### Papers

1. Wittek, R., Menna, A., Schuemperli, D., Stoffel, S., Mueller, H.K., Wyler, R. 1977. *Hind*III and *Sst*I restriction sites mapped on rabbit Poxvirus and vaccinia virus DNA. *J. Virol.* 23:669-678.
2. Saiki, R.K., Gelfand, D.H., Stoffel, S., Scharf, S.J., Higuchi, R., Horn, G.T., Mullis, K.B. and Erlich, H.A. 1988. Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. *Science*, 239:487-491.
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